FLIGHT
The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World
Founder and Editor: STANLEY SPOONER
A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport
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Flight
The Aircraft Engineer and Airships

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

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Sept. 3–4	**Belgian Competitions (Brussels)**
Sept. 4–11	**Brescia Races**
Sept. 17	**Royal Aero Club Race Meeting, Waddon Aerodrome, Croydon**
Sept. 18	**Gordon Bennett Balloon Race, Brussels**
Oct. 1	**Coupe Deutsch de la Meurthe**
Oct. 22–30	**Aero Exhibition, Prague**
Nov. 3	**Lecture, "Manœuvres of Getting Off and Landing," by Sq. Ldr. R. M. Hill, before R.Ae.S.**
Nov. 12–27	**Paris Aero Salon**
Nov. 15–26	**International Air Navigation Congress (Paris)**
Nov. 17	**Lecture, "Requirements and Difficulties of Air Transport," by Col. F. Searle, before R.Ae.S.**
Dec. 1	**Lecture, "Design of a Commercial Aeroplane," by Capt. G. de Havilland, before R.Ae.S.**
Dec. 15	**Lecture, "Development of the Fighting Aeroplane," by Capt. F. M. Green, before R.Ae.S.**

EDITORIAL COMMENT

IN another part of this issue of FLIGHT we print the Report of the Imperial Air Communications Committee, which is issued as an appendix to the Summary of Proceedings of the Conference of Prime Ministers of the Empire, which sat in London during June, July and a part of August. It deals almost wholly with the problem of the airships, and we may say at once that we are by no means satisfied with either its general tenor or its conclusions. In the first place, the Committee, which was presided over by the Secretary of State for Air, had no single member who has any first-hand knowledge of airships or their operation. It would have been thought that if there was present a sincere desire to thrash out the complete possibilities of establishing airship communications within the Empire, the Committee would have numbered among it an officer with full experience of the airship Service—such a one as, for instance, Gen. Maitland. That this was not the case leaves one with the preliminary impression that the Committee was appointed as much to discredit the airship as really to enquire into its potentialities. The worst of it is, too, that the closer the study which is given to the Report, the more that impression is confirmed.

The Airship Problem

In the preamble it is set forth that the Committee was appointed to report upon the cost of erecting masts, providing bases, fuel supplies, upkeep of, commissioning, and operating the existing fleet of airships for the purpose of Imperial air communications, with special reference to the routes between England, India, Africa, Australia and New Zealand; and on services by means of aeroplanes. It may be remarked that all the Committee has to say with regard to aeroplane services is contained within the limits of 16 lines of print! This seems to have a significance of its own. After three years' experience of the operation of commercial aeroplane services, the Committee should surely have been able to advance some more decided views and information than the purely negative statement contained in the Report. The truth of the matter seems to be that they were so busily engaged in sealing the doom of

the airships that they had no time to devote to the investigation of anything else.

When we leave the generalities of the Report and come down to the figures given, it seems to become plain that these have been put at the highest possible point, as though the intent were to show that airship services can only be run at a relatively ruinous cost. We shall challenge some of these figures presently. The truth of the matter is—and we have neither scruple nor hesitation in saying this—that the Air Ministry, with the exception of those who have worked with airships during and since the War, has no belief in lighter-than-air craft, and the Committee has quoted absurd figures in order to make them show up badly. We have known for a long time that there were many wheels working within wheels where the airships are concerned, and that there is a very strong adverse influence at work. Otherwise, why was there no airship expert on the Committee, and why was no officer or official with extended experience of airships called to give first-hand information for the guidance of the Committee?

Now, as to certain of the figures quoted in the Report. One glaring example of inaccuracy is in connection with the price of hydrogen, which is assumed at 20*s.* per 1,000 cu. ft. If the Committee had been seriously desirous of ascertaining the real price of this essential gas, it could have discovered that the real price is not 20*s.* per 1,000 ft., but 6*s.* Supplies have been quoted for at this figure within the past few weeks. That is to say, the assumed figure is too high by about 70 per cent. Then, the cost of moving the mooring mast from Croydon, presumably to Cardington, though nothing is said as to where it is to be removed to, is put at £10,000. This in face of the fact that *there is in present existence a quotation from a very well-known steel firm for the erection of a steel mast, 160 ft. high, with concrete foundation,* FOR £3,600. There seems to be something very wrong with the Committee's figures. Moreover, why has the Committee been so shy of estimating for revenue? All they have to say is that, "With the data available, and taking into consideration the natural conservatism of the general public towards the adoption of new methods of transport, the Committee consider that it is impracticable to frame any trustworthy estimates of the revenue to be earned by the existing fleet." They do not even add the opinion that, naturally, there will be *some* revenue! The whole question of the earning possibilities of the airship is passed over in this somewhat contemptuous paragraph. We do not like it. The attempt to "crab" the lighter-than-air craft is too obvious all through the Report.

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Why Rigids at all?

The terms of reference of the Committee did not include any alternative to the existing fleet of airships, and thus no blame whatever can attach to them for not entering into the question of whether or not the big rigid is the best type for opening up Imperial air communications. It is at least questionable whether there is not an alternative, and we suggest that the subject is a proper one for official enquiry before a final decision is taken, one way or another, as to the fate of the airship service. We note that the Report examines the expenditure necessary to carry on an airship service for five years, and the proposal involves the building of twelve new ships at a cost of £4,545,000, the cost of the first being put at £300,000, the next three at £250,000 each, and the remaining eight at £240,000 per ship. Have we become obsessed by the big rigid? Is it not at least possible that there is a smaller, cheaper type of ship which will show a better commercial prospect than these huge craft which cost an enormous amount of money to build? We do not propose to dogmatise, but it will be of more than passing interest to examine the possibilities.

Let us take a type such as the Parseval, which is a thoroughly practical ship. The 18-ton Parseval is capable of carrying a load of 25 passengers and 7 as a crew for 1,000 miles at a cruising speed of 60 miles an hour. These ships can be built in England for NOT MORE than £30,000 each, so that ten Parsevals can be obtained for the cost of the first rigid as proposed in the Committee's Report. They have neither the capacity nor the endurance of the larger craft, but they are certainly capable of working on the Imperial air routes with a considerable degree of success. Assuming it is desired to open up communications between England, Egypt, India and Australia, it would be necessary to erect mooring masts at London, Marseilles or Rome, in Egypt, at Basra, Calcutta, Colombo, Singapore, Java, Perth, Melbourne, and at a point in Northern Australia. These stations, twelve in all, would cost £50,000 each. (The Report mentions £55,000.) This would total £600,000. Assume that twelve ships were required to be always in commission, with an equal number in reserve, we get to a figure of £720,000 for 24 airships, or a total capital expenditure on ships and stations of £1,320,000. With this number of ships it would be possible to run services between this country and Australia three times a week, instead of the fortnightly service suggested in the Committee's Report. These would carry 75 passengers per week each way, in stages, instead of the average of 25 per week carried by the 4,000,000 cu. ft. ships mentioned in the aforesaid Report.

We need not pursue the subject farther just now, except to say that this is a very brief outline of a scheme which lies before us for establishing an Imperial airship service. This scheme shows that for a total capital expenditure of £2,320,000 these services can be put into being. Allowing a further £680,000 for contingencies, it calculates that a total capital of £3,000,000 would have to be available, which compares, on figures alone, very favourably indeed with those discussed by the Committee. We need not commit ourselves to a judgment of the scheme in question, but it looks on the face of it thoroughly practical, and when we say that it has been put forward by an officer of long experience and distinguished record in the airship service, we think we are justified in saying that a case for the very closest examination is fully made out.

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Mr. Hughes on Airships

In the course of an interview with *The Times*, Mr. W. M. Hughes, Prime Minister of Australia, referred among other matters of Imperial interest to airships and Empire communications. Asked whether he was satisfied with the Report of the Committee we have been discussing, he said:—

"In so far as the advice tendered has relation to the technical side of the question it is not for me, clearly, to attempt to criticise it. But if you ask me whether I am satisfied with the proposal to cast aside the instrument of Empire communication, which, I may remind you, cost something like £40,000,000 to bring up to its present state of

development, and which offers the most hopeful means of bringing this world-wide Empire of ours within a narrower compass, then most emphatically I am not satisfied."

"But did not the conference agree to allow you to suspend the order for scrapping the airship fleet until opportunity had been given you to put the matter before the Australian Parliament?"

"Yes, that is so, but I hope that nothing will be done by the sale of spare parts or the machinery and plant which have been assembled for maintenance and repairs; so as in effect to make any attempt at a successful experiment by Australia impossible."

Obviously, the Australian Premier is in full accord with the idea of linking up the Empire by means of air communications, and that, further, he looks to the airship as the means to that end. We may say that we are backing the cause of the lighter-than-air craft not because we hold any brief for one side of aviation more than another. But we hold, as Mr. Hughes also apparently does, that it is to this type we must pin our faith for long-distance services for some years to come at any rate. Experience has shown that for overseas communications the aeroplane still lacks many essential qualities. It has not the necessary endurance to begin with, and when we have said that we have said enough to indicate that the least to be predicated is that the possibilities of the airship must be explored to the utmost in the effort to speed up Imperial communications.

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Air Progress in Australia

The Australian Government is going ahead fast in aerial matters. It is now calling for tenders for the conveyance of mails by air over routes from Sydney to Brisbane, a distance of 540 miles along the coast, and between Sydney and Adelaide, *via* Hay, some 795 miles. The service is to be a weekly one, and the maximum to be paid for the first is £11,500, and for the second £17,500, the period involved being twelve months. The sum of £100,000 has been voted for grants in aid of civil aviation, and, in consultation with the Society of Aircraft Owners, it has been decided that the wisest manner of applying this money is by the establishment of aerodromes and emergency landing grounds, and not by way of subsidies to individual companies. A measure of direct assistance is also held desirable, and this is to be given by the allocation of mail contracts to civilian companies on a scale that will permit of the use of modern machines. The Postmaster-General has, accordingly, been asked to state his policy regarding such contracts, and should a satisfactory arrangement be arrived at, the Post Office and the Department of Civil Aviation will co-operate with a view to the inauguration of such services during the financial year 1921–22.

In many other directions there are signs that the Australian Government realises to the full the vast possibilities of aircraft in opening up and maintaining communications over the vast distances of the Commonwealth, and that it intends to exploit them wherever there is opportunity. This is very much as it should be, and we congratulate Australia on the wisdom and foresight which is being displayed in matters affecting civil aviation.

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Safety Tanks for Aircraft

As announced elsewhere in this issue, the Air Ministry proposes to hold a competition for safety fuel tanks, commencing December 1, next. Prizes to the amount of £2,000 are to be given, the first being a sum of £1,400, and the second and third £400 and £200, respectively. The idea is to obtain a tank which will not only be reasonably proof against the contingencies already noted, but which will be secure against serious leakage in the air when damaged by machine-gun fire using incendiary, armour-piercing, or explosive ammunition, or by shell fire.

The requirements are exacting, but rightly so. It would be comparatively easy to design a tank which would meet them if weight were a minor consideration, but within the limits set by the Air Ministry, which call for a maximum weight of 1·75 lbs. per capacity-gallon, it will require considerable ingenuity to devise a tank with the called-for qualities. Still, it ought to be possible, and the competition will doubtless result in the demonstration of a good deal of progress in the right direction.

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THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN AUG. 14 AND AUG. 20, INCLUSIVE

Route‡	No. of flights*	No. of passengers	No. of flights carrying: Mails	No. of flights carrying: Goods	No. of journeys completed†	Average flying time	Fastest time made by	Type and No. (in brackets) of Machines Flying
						h. m.		
Croydon-Paris	44	157	13	27	43	2 37	D.H.18 GEAWO (2h. 08m.)	B. (8), Bt. (1), D.H.18 (2), G. (4), H.P. (4), Sa. (1), Sp. (5), V. (1).
Paris-Croydon	45	261	14	26	43	2 45	D.H.18 GEAWO (2h. 02m.)	B (7), Bt. (1), D.H.4 (1), D.H.18 (2), G. (5), H.P. (4), Sa. (1), Sp (7).
Croydon-Brussels ...	7	12	3	3	7	3 32	D.H.4 O-BARI (2h. 37m.) ..	D.H.4 (3), G. (1).
Brussels-Croydon ...	8	29	5	5	7	3 07	D.H.4 O-BADO (2h. 10m.)	D.H.4 (3), G. (1)
Croydon-Amsterdam ...	6	9	6	6	6	3 47	Fokker H-NABK (2h. 47m.)	D.H.9 (1), F. (3),
Amsterdam-Croydon ...	6	16	6	6	6	3 18	Fokker H-NABJ (2h. 49m.)	D.H.9 (1), F. (3).
Totals for week ...	116	484	47	73	112			

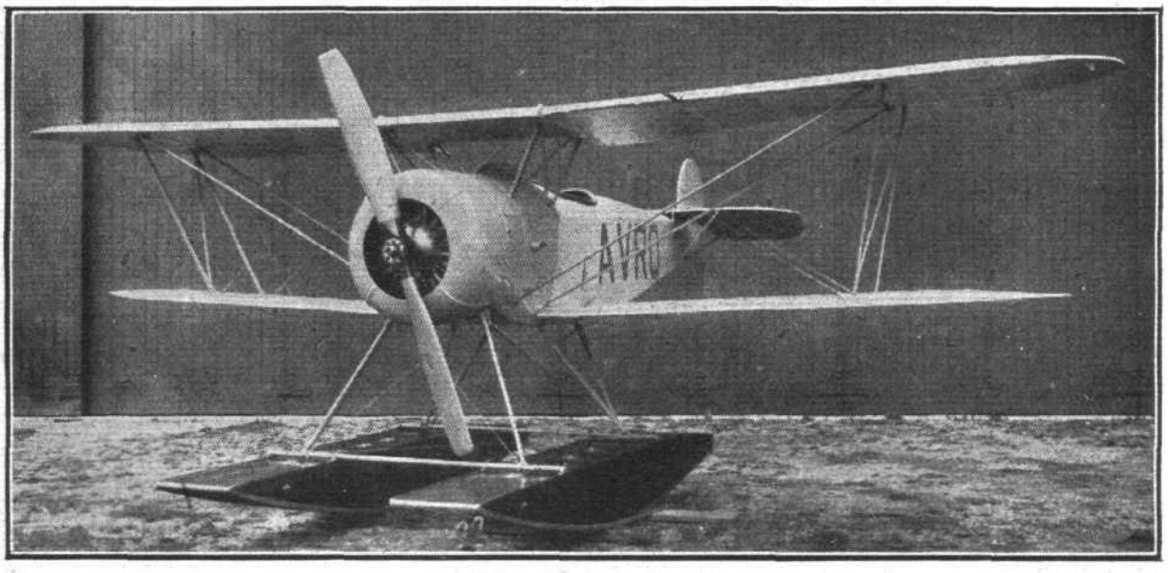
* Not including "private" flights. † Including certain journeys when stops were made *en route*.
‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez. Sa. = Salmson. Se. = S.E.5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

AN ANTARCTIC AVRO

Sir Ernest Shackleton's Scout

WHEN shortly the *Quest*, the ship in which Sir Ernest Shackleton and his companions are about to set out on their journey of exploration, slips her moorings near London Bridge, she will carry under her bridge a small two-seater seaplane, which it is intended to use for photographic survey work on the antarctic journey. That the seaplane offers great possibilities for this class of work is not to be doubted. It provides a platform from which many miles of country (or sea) can be surveyed, and it is able to cover distances in as many hours as previously took weeks when dog-sledges were the camera mounts, etc. From the accompanying scale drawings it will be noticed that the Avro has a rotary engine—an 80 h.p. le Rhône, to wit. This should not be taken as an indication that the Green engine is not suitable for the Avro Baby. The wonderful flights made by Hinkler on this combination are sufficient refutation of any such assumption. Under such temperatures as may normally be met with the Baby-Green combination is all that it could be. But in the cold of the extreme south the matter of water-cooling might be one of some difficulty. In order to eliminate this possible source of



THE AVRO BABY SEAPLANE : Three-quarter front view.

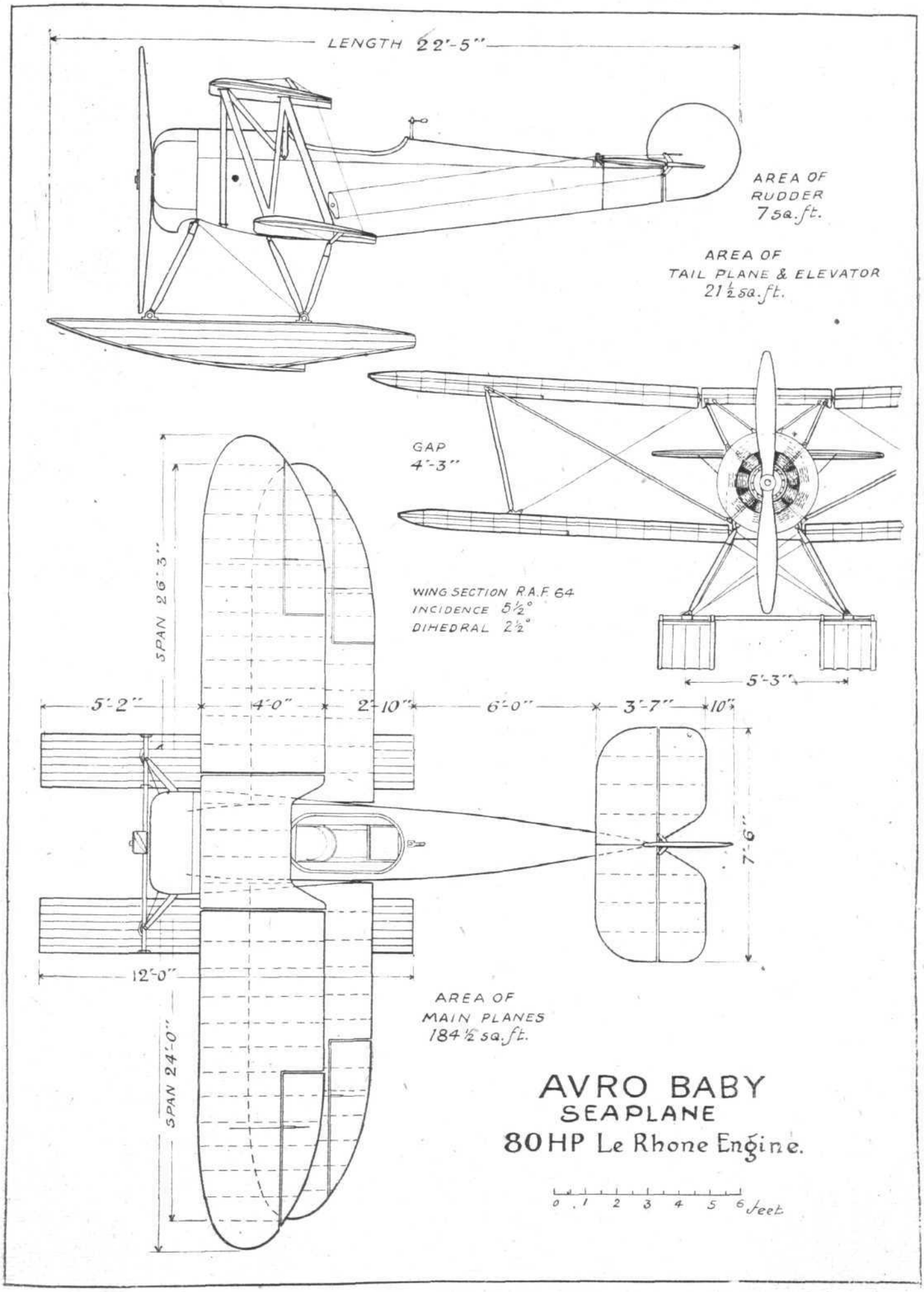
conveyance, especially where the ground is uneven. It may even be supposed that it will be possible for a small light machine to take off, if necessary, from an ice field, providing a sufficiently long, smooth stretch can be found. We are not aware that Sir Ernest intends to use his seaplane for this purpose, but it appears to us that it might be found useful, when the ship approaches ice-floes, for sending out to find, like a sort of modern dove from the ark, open "lanes" through which the ship may proceed, and which could not trouble—and in a case like this it is of little use to trust to luck—an air-cooled engine has been chosen. This would seem to solve the cooling problem, since the correct amount of cooling can presumably be obtained by alterations to the cowling such as can be undertaken on the spot by means of tools and materials carried on board. There would then appear to remain only the questions of carburation and lubrication. As regards the former we do not know whether or not any special precautions have been taken, but the latter

THE AVRO BABY SEAPLANE : Three-quarter rear view.

have been discovered from the relatively low point of vantage provided by the crow's nest. A number of other possibilities suggest themselves, but for anyone not familiar with the actual conditions obtaining in the far south it is next to useless speculating on the possible activities of an aircraft.

The primary object of taking a seaplane out there is, we understand, to employ it for photographic survey work, for which purpose the machine—a Baby Avro—is fitted with has been ensured by placing the oil tank between the two engine plates, to the space between which the hot exhaust gases are admitted, thus keeping the oil in the tank warm and sufficiently thin to flow easily to the pump, even when the outside air is very cold.

As regards the machine itself, it is, as will be seen from the accompanying photographs and general arrangement drawings, a more or less standard Avro Baby, with the excep-



THE AVRO BABY SEAPLANE : Plan, side and front elevations, to scale.

tion of the fitting of a le Rhône engine in place of the customary Green. Also, of course, the machine is fitted with twin floats in place of the land under-carriage, but this has been done experimentally on the standard Baby. When we say more or less standard, this applies to the general appearance only. One would have recognised the machine as an Avro instantly. But in the detail design there are many alterations, necessitated by the particularly strenuous and exacting conditions under which the machine will be required to operate. For instance, it may be stated that in designing the machine the questions of strength, hard-wearing qualities and ease of erection have been given priority over performance, although the latter is by no means bad, as will be realised when it is pointed out that the engine loading is approximately 19 lbs./h.p. and the speed at sea level 90 m.p.h., while the climb to 5,000 ft. occupies only 15 minutes. Further, the machine gets off remarkably quickly, and handles well on the water, being easy to taxy, even in a strong wind. In view of the fact that the machine may, and probably will, frequently have to manœvre among ice-floes, this is of considerable importance.

The Fuselage

As regards the general *fuselage* construction, this follows standard Avro practice: that is to say, the *fuselage* is a girder with *longerons* of ash and struts of spruce, the framework thus formed being braced with wire and Avro turnbuckles. The engine plates are in the form of two multi-ply wood bulkheads, covered with aluminium sheeting riveted on.

The Avro Baby Seaplane: Side view.

In the upper part of the space between these two bulkheads the oil tank is mounted, and the engine cowling is so arranged that the exhaust gases can collect under and around the lower portion of the tank, thus keeping the oil from getting too thick to run freely to the pump.

The *fuselage* covering is fabric over the aft portion, while the nose is covered with aluminium sheeting.

Special attention has been paid to ease of access to the engine, the whole cowl being easily removed by undoing the turnbuckle of the cable which runs around the groove in the cowl, when the engine, oil pump, magneto and engine controls are all very accessible.

The Wings

Mention has already been made of the fact that ease of erection was one of the first considerations in designing this machine. One of the results of this has been that the wing bracing has been somewhat modified. In place of the usual Avro struts of wood, with their bracing cables, streamline steel tube struts have been used for the interplane struts. These, it will be seen, are of N formation, and are attached to the spar fittings by quickly detachable pins. The fact that the struts are triangulated determines the angle of incidence of the wing tips without any trueing-up. The main lift members are also streamline steel tube struts, cut dead to length and thus fixing the dihedral angle. The anti-lift members are cables, and it is of interest to note that these are the only cables in the wing bracing. The lift ties are attached to the spar fittings and lower *longerons* by pins of the same pattern as those used for the interplane struts. That is to say, each strut in the machine terminates in a tubular socket into which the pin passes. The pin has a swivelling piece held in position by a spring, so that taking out the pins is a matter of a few moments only. A somewhat similar arrangement is employed where the wing roots attach to *fuselage* and top centre-section, so that the whole wing structure can be taken down and again erected very quickly. This is, of course, a very valuable feature for a machine which has normally to be carried in the smallest possible space on board ship, while it may be required to take the air at a moment's notice. Incidentally it should be noted that upper and lower planes are identical (except the strut fittings), so that in case of damage a spare wing can be fitted to either top or bottom as required.

The construction of the wings themselves follows standard practice: that is to say, the spars are spindled out to an I section and carry ribs of lattice girder type with spruce flanges and three-ply wood ties. Special I-section spruce ribs are fitted at the wing roots to resist the pull of the fabric. The leading edge of the wings has been made particularly strong, the top surface, from the leading edge to the top of the front spar, being reinforced by $\frac{3}{32}$-in. thick mahogany. The end sweeps and trailing edges are formed of steel tubing.

The internal drag bracing consists of tubular compression struts and high-tensile steel wire bracing with Avro turnbuckles. It might also be mentioned that the wing section is R.A.F. 64. Lugs for slinging tackle are provided on the centre-section of the top plane.

The Tail

The tail planes are of the usual Avro type, approximately rectangular in plan with just the corners rounded off. The elevator is of the divided type, and the tail plane is so mounted that its incidence can be altered (not during flight) to trim the machine according to whether it is used as a single-seater or a two-seater.

The Twin-Float Under-carriage

From the illustrations it will be seen that the machine is of the twin-float type, with rectangular section, one-stepped floats. These are built of two skins of mahogany over a framework of elm. It should be pointed out that all the longitudinal members of the floats run right through, with the step added afterwards as a separate unit, riveted to the main float bottom. The two mahogany skins are separated by a layer of canvas set in varnish, and the planks of the inner skin are laid diagonally, while those of the outer skin are laid longitudinally.

The floats are supported on streamline steel tube struts which are attached to the *fuselage* by ball-and-socket joints. All the float bracing and strutting is provided with quick-release fittings, so that the floats can be detached from the machine and dismantled in a few minutes. The floats are

divided by watertight bulkheads into six compartments, so that in case of holeing one of these there should still be ample buoyancy to keep the machine afloat. Each compartment is provided with inspection cap and drain plugs.

Cockpit, Equipment, Etc.

Mention has already been made of the fact that the Avro Baby is intended for use on photographic survey work. In order to facilitate this, the cockpit arrangement has been somewhat differently carried out. In place of the two separate cockpits usually found in two-seaters, the two occupants are in one common cockpit, and can thus easily communicate with one another. The pilot occupies the front seat, which is of the aluminium bucket type. The aft seat is without back rest, and is so hinged that it may be swung aft, when the photographer sits facing forward, or it can be swung forward to allow the photographer to face aft while operating the camera mounted above and behind the cockpit coaming. A special cinematograph camera will be used, and also a " still " aerial camera.

The machine will be piloted by Major C. R. Carr, D.F.C., who has considerable experience in flying in cold climates, such as Northern Russia and the Baltic. Capt. Wilkinson, M.C., who is the naturalist of the expedition, and has taken part in several Polar expeditions, will be the observer and photographer. The Baby has been very thoroughly tested at the Avro aerodrome at Hamble, the final test being a flight of 1½ hour's duration, in which the machine was piloted by Major Carr, with Capt. Wilkinson as passenger. During this flight the cinematogrpah camera was carried on board, and a series of pictures taken.

Following are the main characteristics of the Avro Baby seaplane : Length, overall, 22 ft. 5 ins. ; span, upper plane, 26 ft. 3 ins. ; span, lower plane, 24 ft. ; chord, 4 ft. ; gap, 4 ft. 3 ins. ; stagger of planes, 1 ft. 6 ins. ; wing area, 184½ sq. ft. ; weight, empty, 1,000 lbs. ; weight, loaded, 1,600 lbs. ; wing loading, 8.67 lbs/sq. ft. ; power, loading, 18.85 lbs./h.p. ; petrol capacity, 16 gals. ; oil capacity, 4 gals. ; maximum speed, sea level, 90 m.p.h. ; cruising, 70 m.p.h. ; landing, 43 m.p.h. ; climb to 5,000 ft., 15 mins.

Altogether the Avro Baby seaplane is a very fine little machine, which reflects great credit on her designer, Mr. Roy Chadwick, and on the constructors, Messrs. A. V. Roe and Co., Ltd. The name of Avro has so long been associated with pioneering that one is pleased to see once again an Avro machine breaking new ground (or should one say ice in this case ?). We wish the expedition the very best of luck, and in the months to come our thoughts will often wander down to the southern regions where the little Avro seaplane will be giving the penguins the surprise of their lives.

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments are notified :—

Flight-Lieut. G. Barrett, A.F.C., from Central Flying School (Inland Area), to School of Photography (Inland Area). Date 15.8.21.

Flight-Lieut. T. C. Thomson, from Central Flying School (Inland Area) to School of Photography (Inland Area). Date 15.8.21.

Flight-Lieut. R. S. Lucy, A.F.C., from Central Flying School (Inland Area) to School of Photography (Inland Area). Date 15.8.21.

Flight-Lieut. R. T. Leather, A.F.C., from Unemployed List to R.A.F. Depôt (Inland Area). Date 8.8.21.

Flight-Lieut. T. C. St. C. Morton, M.B. (Medical), to No. 1 School of Technical Training (Boys) R.A.F. Hospital, Halton, on ceasing to be attached to R.A.F. Central Hospital. Date 22.7.21.

Flight-Lieut. D. A. Stewart, M.C., D.F.C., to No. 216 Squadron (Middle East Area) on ceasing to be attached to Aircraft Depôt, Egypt. Date 5.7.21.

Flight-Lieut. H. V. Jerrard (Stores), from Headquarters No. 11 (Irish) Wing to Half-pay List. Date 26.7.21.

Sqdn.-Ldr. C. Draper, D.S.C., from No. 5 Flying Training School (Inland Area) to Air Pilotage School (Cadre). Date 10.8.21.

Sqdn.-Ldr. A. W. C. V. Parr, from Inland Area Aircraft Depôt to No. 1 Flying Training School (Inland Area). Date 5.9.21.

Flight-Lieut. C. R. Richardson, from School of Technical Training (Men) (Inland Area) to No. 24 Squadron (Inland Area). Date 6.8.21.

Flight-Lieut. W. Sutherland, M.B.E., from No. 29 Group Headquarters (Coastal Area) to No. 230 Squadron (Coastal Area). Date 10.8.21.

Flight-Lieut. T. W. Elmhirst, A.F.C., from No. 267 Squadron (Mediterranean Group) to Seaplane Repair Base (Mediterranean Group). Date 4.7.21.

Flight-Lieut. L. F. P. Bawn from No. 24 Squadron (Inland Area) to Headquarters, No. 1 Group (Inland Area). Date 22.8.21.

Flight-Lieut. L. R. Taylor, M.B.E., from Inter-Allied Aeronautical Commission of Control (Germany) to Instrument Design Establishment (Inland Area). Date 12.8.21.

Flight-Lieut. E. R. Pretyman, A.F.C., from No. 56 Squadron (M. E. Area) to R.A.F. Depôt (Inland Area). Date 23.8.21.

D.F.C. Bar for Mesopotamia Work

THE King has approved of the award of a Bar to the Distinguished Flying Cross to Flying Officer Victor Emmanuel Groom, D.F.C., R.A.F., for conspicuous skill and gallantry under fire in Mesopotamia.

The *Gazette* states that while taking part in a bombing expedition from Mosul on May 5, an aeroplane was shot down by rifle-fire in hostile country three miles west of Batas. Flying Officer Groom at once landed and picked up the crew of this machine while under enemy fire. He then successfully took off down hill and returned safely to Mosul with two passengers in the back seat and a third lying on one of the planes. In addition to showing great promptitude and gallantry, he displayed marked skill in first landing safely under most difficult conditions and then taking off with a very excessive load.

A Daimler Air Service

WE understand that among the new firms, in fact, the first, to be "approved" under the new subsidy scheme for air services is Daimler Hire, Limited, a branch of the famous car manufacturing firm. Col. Frank Searle, best known to readers of FLIGHT from his association with Aircraft Transport and Travel, is mentioned as general manager of the new firm. This is, in itself, a promising sign, for Col. Searle showed great ability during his connection with A.T.T., and with the new and more economical machines that will be used he should have an opportunity of doing even better.

The machines which it is intended to use are the new de Havilland monoplanes, 450 h.p. Napier Lion engine, the first of which is now being tested thoroughly. These machines are very economical, carrying 10 passengers at a cruising speed of 100 m.p.h., while having a maximum speed of over 120 m.p.h. Altogether the new service should make good, having regard to the past experience of Col. Searle, added to his wonderful gift of organisation.

Royal Air Force Memorial Fund

THE Secretary of the Fund has received a cheque for £417 from Sqdn.-Leader Sir Norman Leslie, C.B.E., Commanding No. 25 Squadron, R.A.F., being the net results of the Air Display held at Hawkinge Aerodrome, near Folkestone.

Lieut.-Col. W. E. S. Burch writes he need scarcely say that the Chairman and Committee of the R.A.F. Memorial Fund are extremely gratified and very grateful, for this most handsome contribution to the Fund, and a letter of warm thanks has been sent to Sir Norman Leslie, which thanks, of course, are intended also to be conveyed to his Officers, N.C.Os. and men, whose efforts rendered the function so highly successful.

Aircraft Wreckage and Salvage Law

AN Order in Council published in the *London Gazette* of August 12, prescribes the modifications with which the law relating to wreck and salvage shall be applied to aircraft, as provided for in the Air Navigation Act, 1920. This Act was founded upon the International Air Navigation regulations and annexes issued by the International Flying Convention and published in full in FLIGHT on July 24 and July 31, 1919.

General Newman in Aeroplane Accident

FROM Cairo it was reported on August 15 that an aeroplane carrying on board General Newman, Chief of the General Staff in Egypt, crashed at Heliopolis, the pilot being killed and the General receiving severe injuries. At the time of writing he is reported to be in a critical condition.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

AUTUMN AVIATION MEETING, 1921

(Under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale)

AT WADDON AERODROME, CROYDON, ON SATURDAY, SEPTEMBER 17, 1921,

Commencing at 3 p.m.

The following Programme will be carried out subject to the consent of the Air Ministry :—

1. Club Handicap.—The Entrant of the Winner will receive £20. If five starters, the second will receive £10.

For machines AVRO type, Two-Seater, engine power not to exceed 150 h.p.

The Race is over a distance of approximately 24 miles, comprising three circuits of the course of approximately eight miles.

Passengers are to be carried. For the purposes of this Race, there is no restriction as to weight or age of Passengers, as laid down in the Competition Rules (Rule 2).

The machines will alight on the Aerodrome on completing each circuit and change passengers.

2. First Waddon Handicap.—The Entrant of the Winner will receive £30. If five starters, the second will receive £10.

For machines with a speed of not less than 100 miles per hour.

The Race is over a distance of approximately 24 miles, comprising three circuits of the course of approximately eight miles.

3. First Croydon Handicap.—The Entrant of the Winner will receive £30. If five starters, the second will receive £10.

For machines with a speed of less than 100 miles per hour.

The Race is over a distance of approximately 24 miles, comprising three circuits of the course of approximately eight miles.

4. First Autumn Handicap.—The Entrant of the Winner will receive £50. If five starters, the second will receive £20.

For machines occupying the first three places in the Waddon and Croydon Handicaps. The machines will be re-handicapped for this Race.

The Race is over a distance of approximately 32 miles, comprising four circuits of the course of approximately eight miles.

In addition to the above events, it is hoped to arrange an Inter-Club Race and a Balloon Sniping Competition.

Regulations

Qualification of Competitors.—The Competitions are open to persons of any nationality holding a licence issued by any Aero Club affiliated with the Fédération Aéronautique Internationale.

Organisation.—The Competition shall be conducted by the Royal Aero Club under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale.

Entries.—The Entry Fee for each event is £1. This fee, together with the Entry Form, must be received by the Royal Aero Club, 3, Clifford Street, London, W. 1, not later than 5 p.m., on Wednesday, September 7, 1921.

PROPOSED INTER-AEROPLANE RACE BETWEEN ROYAL AIR FORCE CLUB AND ROYAL AERO CLUB

Mr. Philip S. Foster and General Sir Sefton Brancker, who were the Entrants of the second machine in the Aerial Derby Handicap flown by Flight-Lieutenant W. H. Longton, have offered a £50 Cup for an Aeroplane Race between the Royal Air Force Club and the Royal Aero Club. It is hoped the Race will come off at the Royal Aero Club Autumn Meeting at Croydon, on September 17, 1921.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

THE DEATH OF GENERAL HENDERSON

Late Director-General of Military Aeronautics

IT is with the greatest regret that we have to record the death, at Geneva, of Lieut.-General Sir David Henderson, K.C.B., K.C.V.O., D.S.O., Colonel of the Highland Light Infantry and Director-General of the League of Red Cross Societies. Sir David was in his sixtieth year, and his health had not been good for some time. It had, however, been hoped that the bracing mountain air would assist in his recovery, but the news of his death is the grave of those hopes.

Sir David Henderson will be best remembered by readers of this Journal as Director-General of Military Aeronautics, a post which he held from September, 1913, to October, 1917, when he retired. In this capacity the task of organising the Royal Flying Corps fell to him, and the struggles which he had in the early days in overcoming old-fashioned prejudice are still too well remembered to need recalling here. When war broke out in 1914 three and a half squadrons of twelve machines each—which were practically all the serviceable machines we had at the time—were sent across to France, where they played an extremely important part in the now historical retreat from Mons. We cannot do better than quote Sir John French on the way in which those early pilots covered themselves with glory :

"I wish particularly to bring to your Lordship's notice the admirable work done by the Royal Flying Corps under Sir David Henderson. Their skill, energy, and perseverance have been beyond all praise. They have furnished me with the most complete and accurate information, which has been of incalculable value in the conduct of the operations. Fired at constantly both by friend and foe, and not hesitating to fly in every kind of weather, they have remained undaunted throughout."

When it is realised that out of those three squadrons of aeroplanes of the R.F.C. grew the Royal Air Force, with a total of machines of over 22,000 and 28,000 officers and 264,000 other ranks, it is not to be wondered at that General Henderson did not altogether escape criticism. Rather must one wonder at the foresight and ability which prevented more mistakes being made. His task was overwhelming, and he would have had to be no mere mortal to avoid mistakes altogether. His services to the country during his long and eventful career far and away outweigh any slight shortcomings which have from time to time—justly or unjustly—been laid at his door.

Born in Glasgow in 1862, Sir David Henderson entered the Army in 1883, when he was gazetted Lieutenant in the Argyll and Sutherland Highlanders. He served with distinction in the Soudan and in Egypt. When the Boer War broke out Sir David was already in South Africa on a Government mission, and joined the forces engaged in the defence of Natal. He fought in many actions during the South African campaign, and when Lord Kitchener assumed supreme command he placed Major Henderson (as he then was) in charge of the Intelligence Department.

Sir David Henderson was one of the few who early foresaw the possibilities of aeroplanes in war, not only for reconnaissance, but also for fighting. It is typical of him that, at the age of 48, when on sick leave, he learned to fly at the Bristol school on Salisbury Plain, the better to get the point of view of those who would be working under him. He qualified for his brevet in 1911, and in 1912 was appointed Director of Military Training. He took a prominent part in the Military Aeroplane Trials of that year, and in 1913 he was appointed Director-General of Military Aeronautics and made Colonel of the R.F.C. In August, 1914, he was gazetted General Officer Commanding the Military Wing of the R.F.C., and for the first three years of the War spent himself, regardless of a delicate constitution, on the work of creating, out of nothing almost, the secure foundation of the R.F.C. as a fighting force. In view of the magnitude to which the R.F.C., and later the R.A.F., grew, one is apt to underestimate the difficulties which beset those in whose hands rested the task of early organisation and equipment, but by those who were in intimate touch with aviation in those early days the life-work of General Sir David Henderson will never be forgotten. *Per Ardua ad Astra.*

FLIGHT

COMPETITION FOR SAFETY FUEL TANKS

THE Director of Research, Air Ministry, in aiming at securing the design of a thoroughly safe and reliable fuel tank for service and commercial purposes, is desirous of bringing to notice that it is proposed to hold a competition on the lines laid down and governed by the following rules and regulations :—

1. Prizes

A prize of £1,400 will be awarded to the maker of the tank, which, in the opinion of the Judges, while fulfilling the requirements and possessing the attributes stated below, is best suited for use in aeroplanes and seaplanes.

No guarantee is given that contracts for the successful type of tank will be placed, and should such orders be given they will not necessarily be confined to the prize winner.

The entrant of the tank, which in the opinion of the judges merits second place, will be awarded a prize of £400.

The entrant of the tank, which in the opinion of the judges merits third place, will be awarded a prize of £200.

2. Requirements to be Fulfilled

(*a*) The tank is to be constructed so as to prevent as far as possible leakage or ignition of fuel :

(i) When subjected to stresses similar to those to which the tank would be subjected in an aircraft crash ;

(ii) Subjected to machine gun fire using incendiary, armour-piercing, or explosive ammunition.

Equal importance is attached to the requirements involved in (i) and (ii) above.

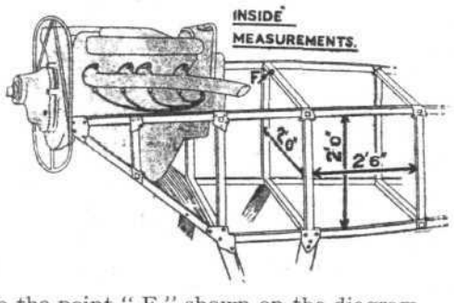
(*b*) The tank is to be capable of being fitted within a space of 2 ft. 6 in. by 2 ft. by 2 ft. In conforming to this rule any shape of tank will be accepted for competition.

(*c*) The capacity of the tank must be within 5 per cent. of 30 gals.

(*d*) All the necessary fittings to enable the tank to be mounted in the structure shown in accompanying diagram must be supplied by the competitor.

(*e*) 1·75 lb. complete with fittings as mentioned in paragraphs (*d*) and (*f*) per gallon capacity is regarded as the maximum weight which would only be justified by very exceptional qualities.

Tanks exceeding this figure will not be disqualified, but it should be borne in mind that great importance will be attached to low weight.



(*f*) In all cases the tank is to be complete with the necessary fittings to enable it to perform its functions of supplying fuel to the point " F " shown on the diagram.

In the case of tanks designed to incorporate leak detectors and similar instruments and devices, these latter will be fitted in such a manner as to show their efficiency under test, and will be included in the weight. In every case there must be at least one filler and also unions for supply and delivery connections, one of the latter at the top, the other at the bottom of the tank.

3. Other Characteristics.

The main requirements to be fulfilled are as detailed in paragraph 2 (*a*) (i) and (ii) " Requirements to be Fulfilled." The relative importance of other characteristics of the tanks will be considered in the following order :—

1. Light weight.
2. Durability under service conditions in the absence of any accident.*
3. Indifference to extremes of temperature.
4. Adaptability of design to large capacities.
5. Simplicity of construction.
6. Adaptability of design to various shapes.
7. Accessibility of fittings.
8. Cost of production.

4. Tests

All tanks will be submitted to preliminary trials. The three best types will be selected by the Judges for the final trial.

Preliminary Tests

For the preliminary tests at least two tanks of exactly similar design will be submitted by each competitor. Both of these will be subjected to a crashing test of the following nature.

The tank will be mounted in a wooden structure conforming in general to the design shown in the diagram, it being mounted behind a concrete body formed to represent an engine. The tank will be released down a wire ropeway, approximately 100 ft. high, so arranged that the structure will strike the ground at an angle of not less than 45° from the horizontal and will be free to turn over. This will ensure as far as possible the conditions prevailing in a typical aircraft crash.

In both the above-mentioned tests the tanks will contain 22 gallons of petrol which will be supplied by the Air Ministry.

Final Tests

For the final tests at least four tanks of a type will be supplied by each remaining competitor. Minor modifications of the original design may be made in the tank submitted for final text, provided the Judges have previously decided that the modification is one of detail and not fundamental principle. The four tanks must be identical. These will be subjected to crashing and firing test, the former as detailed above, and the latter as follows :—

The tank will be subjected to machine gun fire with ammunition capable of :—

(1) Penetrating the ordinary type of mild steel fuel tank, and leaving small entry and large exit holes when the tank is struck below fuel level.

(2) Exploding and igniting the fuel either on contact or after penetration.

A series of bursts of five rounds each will be fired at a range of 50 yards, the tank being examined after each burst.

The angle of fire will be at the discretion of the Judges.

At any time during the competition the Judges may impose such other tests (*e.g.*, to determine the resistance to acceleration, etc.) as they may desire in order to demonstrate the relative merits of competing tanks.

There will be an interval of at least eight weeks between the preliminary and final tests.

Regulations

(1) The competition will begin on December 1, 1921, and will be held at a place hereafter to be notified to intending competitors.

(2) Each tank entered will be supplied at the cost of the competitor, and is to be packed in a strong case or crate suitable for distant transport by rail, and delivered carriage paid to the appointed place on or before November 23, 1921, the case to be clearly marked " Safety Fuel Tank Competition."

(3) Any communication required to be made in connection with this competition is to be addressed to The Secretary (R.D.I.) Air Ministry, Kingsway, London, W.C. 2, marking all letters " Safety Fuel Tank Competition."

(4) Any competitor may enter several different types of tanks, but two specimens of each type must be supplied by each competitor for the preliminary tests and four for the final tests.

(5) Entries will be received up to and including November 7, 1921.

(6) Entries shall be made in writing on the attached form (a separate form being submitted for each type of tank entered) stating the name and address of the entrant, with particulars of the tank to be submitted, including, if possible, weight and actual capacity ; such information will be treated in strict confidence.

(7) The competition may be postponed or any item abandoned at the discretion of the Judges Committee, and in the event of such postponement or abandonment no competitor shall have any claim whatever against the Judges Committee or Air Ministry.

(8) The supreme control of the competition will lie with the Judges Committee who will decide the winning, second and third competitors. Their decision shall be final and without appeal. No decision of the Judges Committee shall give any claim to a competitor who is subsequently shown to have failed to observe these regulations.

(9) The Judges shall be appointed by the Air Council.

(10) Any information obtained from or reports in connection with this competition shall be considered as secret, and shall not be communicated to the Press or otherwise published without the previous consent in writing of the Director General of Supply and Research.

* It is pointed out that in the case of scout aircraft the stress due to acceleration may amount to three or four times that due to gravity.

IMPERIAL AIR COMMUNICATIONS COMMITTEE REPORT

IN the official report on the recent Conference of Prime Ministers, etc., an appendix gives the technical report of the Sub-Committee on Imperial Air Communications.

The members of this Committee were Captain F. E. Guest, Secretary of State for Air (Chairman); Lord Gorell, Under-Secretary of State for Air; Air-Marshal Sir H. M. Trenchard, Chief of the Air Staff; Major-General Sir F. H. Sykes, Controller-General of Civil Aviation; Sir G. L. Barstow, representing H.M. Treasury; Sir James Stevenson, representing the Colonial Office; Mr. J. H. Lovell, representing the India Office; Sir Ross Smith, representing Australia and New Zealand; Colonel H. Mentz, representing South Africa; and Mr. L. V. Meadowcroft, Secretary. The following is the text of the report:—

1. In accordance with the decision of the special Conference of Prime Ministers, we have met as a Committee with the following terms of reference:—To report—(i) On the cost of erecting masts, providing bases and fuel supplies, upkeep of, commissioning, and operating the existing fleet of airships for the purpose of Imperial Air Communications with special reference to the routes between England, India, Africa, Australia, and New Zealand; and (ii) On services by means of aeroplanes.

2. The Committee have held four meetings at the Air Ministry, and have had under consideration the detailed estimates submitted by the Controller-General of Civil Aviation as well as estimates comprised in certain schemes promoted by private individuals.

3. The Committee feel it essential to state in the first place that although the existing fleet of four airships, when put in commission, will enable a scheme of Imperial Communications to be begun, it is insufficient to enable a complete scheme to be developed. Of the existing fleet, only "L. 71" is of dimensions which enable her to make flights to Egypt carrying a commercial load without the necessity for refuelling, and in consequence the performance of this airship alone can be regarded as suitable for regularity of service on long distance flights. The development of a complete scheme will necessarily entail in due course a constructional programme of airships specifically designed for the distances and the commercial needs of the service. Moreover, in having regard to the requirements of a regular service by means of the existing fleet, regard must be paid to the possibility of accident putting one or more of the airships out of commission for at least a number of weeks. The Committee feel that they would not be fulfilling their responsibility if in reporting upon their first term of reference they failed to draw the attention of the Imperial Conference to these material facts before entering upon the possibilities and cost of utilisation of the existing fleet.

4. The Committee think it desirable at the outset to explain the hypotheses upon which the estimates contained in this Report have been compiled. If it be decided that further efforts should be made to develop Imperial Air Communications, the alternatives are to proceed either (*a*) by Government action, or (*b*) by leaving the development of Air Communications to private enterprise (with or without a Government subsidy).

5. In the Estimates submitted in the first part of this Report the Committee have assumed the adoption—for the present at any rate—of a scheme of development by direct Government action. If this course be adopted, the Committee anticipate that the commercial character of the service will render inapplicable the usual rules of public finance as applied to voted services, and that it may be desirable to set up a statutory board (after the model of the Pacific Cable Board) with powers to conclude contracts, fix rates for passages, etc., without external control, save as to the total capital to be provided by the Home and Dominion Governments.

6. If the second course—namely, private enterprise—be adopted, it would naturally be for whatever company or syndicate undertakes the service to develop it according to the programme best suited to the company's interests. In the second part of this Report the Committee have analysed certain of the schemes submitted, so that their schemes of capital cost may be compared with that under the hypothesis of Government action.

The Committee take the opportunity of observing that in their view the best hope of the successful development of Imperial Air Communications lies in private enterprise conducting the service for profit, like the Mercantile Marine, on business lines.

Development by Government Action

7. The development of a complete scheme of air communication between England, India, Africa, Australia, and New Zealand, will necessarily be a matter of some considerable time, and in consequence the Committee considered it desirable, in framing estimates, to deal with the establishment of an airship service in stages.

8. *Six Months' Period.*—The Committee first of all addressed their attention to an examination of the arrangements that would be necessary, and the cost that would be incurred if a decision were taken to delay closing down of the present airship service for a period of six months in order to enable a permanent scheme to be formulated.

The cost of such decision was estimated at £188,000.

A further sum of £44,000 is estimated as necessary to put "L. 71" into commission for commercial purposes.

9. The Committee have come definitely to the conclusion that, in view of the above figures, and of the impossibility of obtaining in so short a period as six months satisfactory data for arriving at a decision as to the future of the service, they are not justified in asking the Imperial Conference to consider any inaugural scheme based upon a period of less than one year. Emphasis was laid on the impossibility of arriving at accurate estimates for, and carrying out satisfactorily, any operational experiments with an airship service if its immediate future remained a matter of uncertainty; and it was also established that the greater part of, if not the whole of, the first six months would necessarily be taken up with work of a preparatory character.

10. After detailed consideration, the Committee have therefore decided to submit to the Imperial Conference two alternative estimates, the one covering a period of one year, the other two years, neither of these periods being regarded as complete in itself. Having regard to the first term of reference and the limited cargo-carrying capacity of airships, these estimates should be for the provision of a limited and possibly irregular service for passengers and mails only to the eastern boundaries of the Empire, utilising the existing fleet to its utmost capacity.

The Committee feel it desirable to draw attention to the fact that should the Imperial Conference decide in favour of the initial period of one year, a second decision as to the future would need to be taken many months in advance of the termination of that period in order to allow of arrangements being entered into, especially in respect of the erection of a shed in Egypt, so as to obviate delay and consequent additional expenditure, if at the end of one year operational experiments for carrying on the service beyond Egypt were to be undertaken.

11. *One Year Period of Inauguration.*—Assuming the one year period of inauguration to begin on September 1, 1921, it should be possible by March, 1922, to have made such progress in ground organisation and experience as to be able to start a monthly service to Egypt. Towards the close of this period it should also be possible to undertake demonstration flights from Egypt in the direction of India and South Africa, without, however, landing, unless by then masts have been erected in those countries.

It is estimated that to carry out this programme the cost involved, which would cover the necessary research and training flights at home, would amount to £540,000.

A detailed statement in regard to the expenditure involved is attached to this Report; were it decided not to commission "L. 71," it is estimated that a saving of some £80,000 could be effected. At the same time, to attempt a regularity of service to Egypt and demonstration flights beyond with two airships, "R. 37" and "R. 36," one of which has not yet been completed and the other of which has not yet been fully tried out, is held to be unwise.

"L.71," owing to her greater size, is the only one of the three whose capacity allows an adequate margin of safety for a return flight from Australia to Ceylon or South Africa under adverse conditions. "R.37" and "R.36" could carry a commercial load to Australia if the necessary number of additional intermediate mooring mast stations were erected; these would, however, necessarily greatly increase the capital cost. In the above operational programme the "R.33," owing to its smaller range and carrying capacity, has been considered as a reserve for training at home.

12. *Two-Year Period of Inauguration.*—In the event of the adoption of a two-year period a monthly service to Egypt would begin in March, 1922, as in the one-year period. This monthly service would be extended to India in September of that year, while demonstration flights towards South Africa would be carried out during the last two or three months of the period. For this programme it is essential that "L.71" should be commissioned.

The cost involved would be £1,339,000.

This sum provides for the erection in Egypt of a complete

base with shed, as distinct from a station with mooring mast only—proper housing accommodation in Egypt being held to be essential if a regular service to India is to be maintained.

It should be noted that whereas the estimated cost of the longer period of inauguration compared with that of the shorter is as 2½ to 1, the useful work accomplished is as 5 to 1.

Allowance has been made for research work in the estimates for both of the above periods, but the purchase of land for overseas bases has not been included. In this regard, it is held that the Dominions and countries over which the routes pass might be prepared at least to grant the necessary land free of cost in return for the privileges conferred. The Committee desires to draw the particular attention of the Governments concerned to the assistance which they can render not only in this regard, but also by assuming responsibility for the actual erection of mooring-mast stations.

Further Development

13. As stated in paragraph 3, further development has been regarded as dependent on the construction of new airships specifically designed to meet the requirements of the service. In order to enable the Imperial Conference to arrive at a decision in respect of a complete scheme of Imperial communications by airship the Committee have felt it necessary to consider estimates for the period ensuing on the inauguration of the service, which will include an adequate constructional programme. In paragraph 10 it has been stated that neither the one-year period nor the two-year period can properly be regarded as complete in themselves; to reap the fullest advantage it is essential that each should be held to be but the stepping-stone to further development. Such development should convert the experimental flights towards South Africa, which will have been undertaken in the inaugural period, into a permanent regular service, and should make possible the alternative route via South Africa to Australia. Both, however, are dependent upon two things: first, upon the provision of new ships. It is estimated that 10 to 12 ships of the 4,000,000 cub. ft. type would suffice to maintain a fortnightly service from England to Egypt, India, South Africa and Australia. The first of such airships would probably cost in the neighbourhood of £300,000. Secondly, both developments would depend upon the provision of masts and bases. Before the route to South Africa could be adequately extended to Australia it would be necessary to provide for the equipment of a permanent base in South Africa; and before the route to Australia could be considered consolidated, it would be necessary to provide the equipment of a permanent base in Australia. It is estimated that the additional cost of such bases, over and above the mooring-mast stations, would be in the neighbourhood of £400,000 each. In addition, it must not be overlooked that the construction of additional airships would entail the provision of additional shed accommodation at the English base, the cost of which may be estimated to involve an expenditure in the neighbourhood of £500,000.

In view of the above considerations, the Committee have considered estimates for the development of the service over a further period of three years.

The estimated expenditure involved would be:—Capital expenditure, £4,545,000; maintenance of ground organisation, £901,000; allowance for contingencies and unforeseen expenditure (say), £1,500,000, to which must be added the cost of upkeep and operation of the airships themselves. This latter item would increase from £160,000 per annum at the end of the preliminary two-year period to £1,094,000 per annum, omitting special allowance for contingencies, by the beginning of the six-year period, when regular fortnightly services were being operated to India, South Africa and Australia. The capital expenditure includes the provision of twelve new airships.

The Committee have felt it necessary to state that these figures are given with the greatest reserve.

As regards the inaugural period, the extension of the route to South Africa, and the opening of the alternative routes to Australia, must entail the provision of mooring-mast stations, in addition, as already pointed out, to the ultimate provision of bases equipped with sheds. The cost of the necessary mooring-mast stations on the route Egypt-South Africa-Australia and back to Egypt *via* Ceylon, is estimated at £275,000. This organisation would only be sufficient to meet the requirements of demonstrational flights. Two such flights to Australia, *via* South Africa, would cost in the neighbourhood of £33,000, and whilst the Committee have given every consideration to the great educational value of such flights as a means of establishing the ultimate possibilities of the service, it is for consideration whether the results achieved would be commensurate with the expense involved or such as would be ensured by a regular programme of development.

Revenue

14. With the data available, and taking into consideration the natural conservatism of the general public towards the adoption of new methods of transport, the Committee consider that it is impracticable to frame any trustworthy estimates of the revenue to be earned by the existing fleet, and the minimum organisation for which estimates have been given in the foregoing paragraphs. With the exception of "L.71," the existing fleet consists of ships which are not economical for commercial purposes, and it is obvious that the revenue ultimately to be derived from the complete service must be governed by the suitability of the ships in use. If, however, with the existing fleet, Marseilles were to be used as a re-fuelling base, so as to obviate the necessity for carrying fuel supplies for the full journey to Egypt, "R.36" and "R.37" would be able to carry, as a maximum load, 30 passengers and a cargo of two tons weight; and in the latter part of the inaugural period, at any rate, a definite revenue from such carriage may be expected. The same consideration as to re-fuelling facilities governs the estimate of revenue to be derived from flights from Egypt to India. It would be necessary, in order to obviate a large reduction in revenue, at least as regards the "R.36" and "R.37," to provide for re-fuelling facilities at an intermediate point. In order that the fullest information may be available for the Imperial Conference upon this point, the carrying capacity of individual airships is set out below.

Carrying Capacity of Individual Airships

Ship.	Route.	Maximum Load.
"R.36" and "R.37" (2,100,000 cub. ft.)	England to Marseilles and Marseilles to Egypt.	30 passengers and 2 tons mails or freight.
"R.36" and "R.37"	England to Egypt	No useful load.
"L.71" .. .. (2,400,000 cub. ft.)	England to Marseilles and Marseilles to Egypt.	40 passengers and 7 tons mails or freight.
"L.71"	England to Egypt and Egypt to Karachi.	35 passengers and 2 tons mails or freight.
New Airship .. (4,000,000 cub. ft.)	England to Egypt and Egypt to Karachi.	50 passengers and 13 tons mails or freight.

Aeroplane Services

15. With regard to their second term of reference, namely services by means of aeroplanes, the Committee consider that it is impracticable at present to present estimates of value. The policy on which the Air Staff are working is to try and establish an Air Line of communications as far as possible touching British points throughout the world, on the principle of linking up with direct air communication the centre of each group of air stations with the next group. The Committee are of opinion accordingly that due consideration should be given in the selection of Imperial air routes to the service aspects, including defence, and to the assistance which the service could afford to civil transport services. They welcome the proposal to open up sections of the Cairo to Karachi route as necessary, and consider that civil aviation should be invited to operate these as soon as possible, and that the Government of India should be informed of the present position of the route as a whole. The Committee feel it necessary to state that beyond the general statements given above, it has not been possible in the time available to consider and report upon the possible future developments of heavier-than-air transport.

16. In concluding the first part of their Report, the Committee feel it necessary to draw attention to the fact that the date at present resolved upon for the closing down of the Airship Service is August 1. In submitting the above alternative estimates for its continuance, the Committee are presenting figures which must, in the absence of an immediate decision to continue for at least the period of one year in accordance with the first estimate above set out, be regarded as affording no data for the cost which would be involved if it were subsequently decided to re-establish Imperial communications by airship.

Development by Private Enterprise

17. In respect of development of Imperial communications by airship by private enterprise, the Committee have to report that in response to the Government offer communicated to the Press on May 31, proposals for carrying on an airship service on a commercial basis have been received from Mr. A. H. Ashbolt, Mr. M. M. Greenhill and Lieut.-Com. Ballantyne, to which definite replies must be given by August 1.

An analysis of each of the three proposals is set out below :—

Mr. A. H. Ashbolt's Proposal

18.—(1) *Capital.*—£1,500,000. *First Issue.*—£750,000 divided as follows :—£375,000 from Dominion Governments ; £375,000 from general public. *Second Issue.*—£750,000 divided as follows :—£375,000 from Dominion Governments : £375,000 from general public, the British Government to have the opiton of taking up the whole or part of the sum.

Mr. Ashbolt states he has been definitely promised underwriting for the subscriptions from the general public on the basis of his terms submitted, or any reasonable modification thereto.

(2) *British and Dominion Governments' Assistance or Liability.*—(*a*) *Share Subscription* (see 1 above).—*Dominions* to subscribe £375,000 towards first issue and £375,000 towards second issue. *British Government* : Nil, but option on second public issue of £375,000.

(*b*) *Completion of Existing Airships.*—British Government and Company to share this expense—say, £73,000. British Government liability of £36,500.

(*c*) *Subsidy.*—£500,000 per annum for 10 years. British Government, £250,000 for 10 years. Dominions, £250,000 per annum for 10 years.

(*d*) *Mail Subsidy.*—All first-class mail matter to be transferred to the Company, and the difference between the rate charged by steamers and railway, and the rate (to be agreed) payable to the Company for similar services to be paid by respective Governments on their outgoing mail.

(3) *Programme.*—To attempt experimental services with existing airships to India, Australia and South Africa, and to establish the necessary ground organisation for such services. The initial services to be considered as entirely experimental. New ships to be built after experience has been obtained on the experimental services.

The first issue of capital is for the purpose of providing ground facilities for the above routes, and the second issue for the purpose of providing new airships.

(4) *Estimates.—Capital Expenditure* : *Egypt Base*, £150,000; *Melbourne Base*, £100,000 ; *Mooring Mast Base*, a sum of £32,000 is allowed.

(5) *Conclusion.*—It will be noted that the Governments concerned are invited to take part both in subscribing for share capital and in the granting of a subsidy for 10 years.

Mr. Greenhill's Proposal

19. (1) *Capital.*—£1.200,000 first year, £1,100,000 second year, £1,000,000 third year, £700,000 fourth year. Total, £4,000,000.

All subscribed by public or privately ; no subscription asked for from British or Dominion Governments.

(2) *British and Dominion Governments' Assistance or Liability.*—(*a*) Completion of existing airships to be undertaken by British Government, say, £73,000.

(*b*) Subsidy of £300,000 per annum until Company is on a paying basis.

(*c*) Subsidy of £75,000 from each of the Dominions, India and South Africa, dependent on a service being maintained to those countries.

(*d*) *Mail Contracts.*—Guarantee of mail contracts from British Government, India, and South Africa.

(3) *Programme.*—Generally, the scheme provides for the gradual development of ground facilities necessary for services to Egypt, India, South Africa, and Australia, over a period of four years concurrently for the construction of ten airships to run these routes. The existing fleet is relied on for two years for demonstration services to Egypt.

(4) *Estimates.—General* : £250,000 is allowed for unforeseen contingencies under capital expenditure. £50,000 is allowed for research on the revenue account. *Insurance and Depreciation* is taken at 20 per cent. for first cost, assuming a seven-year life is taken for new airships ; this would leave about 6-7 per cent. for insurance.

(5) *Conclusion.*—It will be noted that no share subscription is asked for from the Governments concerned, but that the above proposal entails payment of a subsidy both during the development period and for work done, this latter being dependent upon the carrying out of an Imperial service.

Lieut.-Commander W. B. Ballantyne's Proposal.

20. (1) *Capital.*—£2,000,000. First issue £1,250,000.

(2) *Government Assistance.*—

(*a*) *Guarantee of Interest* at 6 per cent. per annum until such time as the Company are in a position to pay this rate of dividend, when a debenture issue would be made and the amount owing to the Government paid off.

(*b*) *Subsidy.—Mail Subsidies* from Great Britain, Italy, Egypt and South Africa, amount not stated.

(*c*) *Subsidy from Admiralty and War Office*, amount not stated.

(3) *Programme.*—Service to Rome, Egypt and Johannesburg with existing airships and later with new airships.

(4) *Estimates.*—The capital of £2,000,000, together with the balance from debenture issue, after repayment to the Government of funds advanced for payment of interest on capital, is for provision of ground facilities on South African route, operation of existing airships, construction of new airships for this route.

(5) *Conclusion.*—It will be noted that this scheme also involves not only a guarantee of interest, but also subsidies from the Governments concerned.

21. *General Conclusion.*—Thus it will be seen that, whether an Imperial Airship Service be undertaken by direct Government action or by private enterprise, it is essential that the Imperial Conference should arrive at a decision by August 1, as Parliament has been informed that the airship services will be closed down on that date.

Appendix A.

ONE-YEAR PERIOD.—*Cost of Erection of Masts, Provision of Bases, and Commissioning Existing Airships.*

A.—Provision of Cardington Base.—(1) Move Croydon Mast, cost £10,000, date of completion Dec. 1, 1921 ; (2) Hydrogen main, £2,000 (Dec. 1) ; (3) Lengthen shed to take "L.71," £15,000 (May 1, 1922).

B.—Commissioning Existing Airships.—"R.36," £6,000 (Nov. 1, 1921) ; "R.37," £25,000 (Jan. 1, 1922) ; "L.71," £44,000 (May 1, 1922) ; New gasbags for "R.36," £25,000 (May 1, 1922).

C.—Provision of Mooring Mast at Marseilles by French, Feb. 1, 1922.

D.—Provision of Cairo Mooring Mast Station, £50,000 (Mar. 1, 1922) ; includes large silicol plant in lieu of small plant and gasometer.

Total capital expenditure, £177,000.

MAINTENANCE AND OPERATION EXPENSES.

A.—Maintenance of Bases.—Cardington for 12 months, £120,000 ; Pulham, £15,000 ; Egypt Mooring Mast Station for seven months, £7,000.

B.—Upkeep and Operation of Airships and Provision of Fuel.—Crews (three), £36,000 ; Petrol and oil, £15,000 ; Hydrogen, £18,000 ; Maintenance, £42,000.

Total running expenditure, £253,000.

Contingencies.—Capital expenditure, £50,000 ; Running expenditure, £60,000. Appendix A, Grand Total, £540,000.

Appendix B.

TWO-YEAR PERIOD.—*Cost of Erection of Masts, Provision of Bases, and Commissioning Existing Airships.*

A.—Provision of Cardington Base.—(1) Move Croydon Mast, cost £10,000, date of completion Dec. 1, 1921 ; (2) Hydrogen main, £2,000 (Dec. 1) ; (3) Erect new mast (wood), £15,000 (Feb. 1, 1922) ; (4) Lengthen shed to take "L.71," £15,000 (May 1).

B.—Commissioning of Airships.—(1) "R.36," £6,000 (Nov. 1, 1921) ; (2) "R.37," £25,000 (Jan. 1, 1922) ; (3) "L.71," £44,000 (May 1) ; (4) New gasbags for "R.36," £25,000 (May 1) ; (5) New gasbags for "R.37," £25,000 (Nov. 1).

C.—Provision of Marseilles Mast by French, Feb. 1, 1922.

D.—Provision of Cairo Base.—(1) Erection of Killeagh Shed, £150,000 (Sept. 1, 1922) ; (2) Mooring mast (wood), £15,000 (May 1) ; (3) Hydrogen plant, £10,000 (May 1) (large silicol plant for use without gasometer) ; (4) Hydrogen plant, £6,000 (May 1) (small gas plant for use with gasometer) ; (5) Gasometer, £20,000 (Sept. 1) ; (6) Gas main, £4,000 (May 1) ; (7) Buildings, £10,000 (Sept. 1) ; (8) Equipment, £4,000 (May 1) ; (9) Petrol storage, £4,000 (May 1), (10) Roads, etc., £20,000 (Sept. 1) ; (11) Transport, £15 000 (Sept. 1) ; (12) Unforeseen, £8,000.

India.—Mooring Mast Station, £60,000 (Sept. 1, 1922) (includes small gas plant and gasometer).

Total capital expenditure, £493,000.

Two-Year Period—Maintenance and Operation Expenses.

(*a*) *Maintenance of Bases.*

	1st Year.	2nd Year.	Total.
	£	£	£
Cardington base.. ..	120,000	120,000	240,000
Pulham	15,000	15,000	30,000
Egypt Mooring Mast Station	7,000	—	7,000
Egypt Base, including Mooring Mast.. ..	—	65,000	65,000
India Mooring Mast Station	1,000	12,000	13,000
	143,000	212,000	355,000

(*b*) *Upkeep and Operation of Airships and Provision of Fuel.*

	1st Year.	2nd Year.	Total.
	£	£	£
Crews (3)	36,000	36,000	72,000
Fuel	15,000	33,000	48,000
Hydrogen	18,000	36,000	54,000
Maintenance	42,000	55,000	97,000
	111,000	160,000	271,000

Total Running Expenditure 626,000.

Contingencies.—Capital Expenditure, £100,000 ; Running Expenditure £120,000 ; App. B Grand Total £1,339,000.

Appendix C.

Additional Expenditure in Third, Fourth and Fifth Years of Five-Years' Period.

The following figures are based upon the assumption that before the middle of the two-year period a programme of development has been drawn up with a view to beginning a fortnightly service to Australia *via* India or South Africa by the end of the fifth year, in addition to fortnightly services to India and South Africa.

The estimate of cost and dates of commencement and completion of items of capital expenditure is as follows :—

A. Cardington Base—Additional Sheds.—(1) New double shed, Cost £250,000, Commencement 1.9.1922, Completion 1.9.1923 ; (2) New double shed, £250,000 (1.9.1923–1.9.1924).

B. South African Route.—(1) Mombasa Mooring Mast Station, £55,000 (1.1.1923–1.12.1923) ; (2) South Africa Mooring Mast Station, £55,000 (1.1.1923–1.12.1923) ; (3) South African Base, £400,000 (1.12.1922–1.6.1924).

C. Australian Route (the expenditure as regards India has already been provided for in the first two years).—(1) Perth Mooring Mast Station, £55,000 (1.6.1923–1.6.1924) ; (2) Ceylon Mooring Mast Station £55,000 (1.6.1923–1.6.1924) ; (3) Melbourne Mooring Mast Station, £55,000 (1.6.1924–1.6.1925) ; (4) Melbourne Base, £400,000 (1.3.1924–1.9.1925).

D. Construction of New Airships.—No. 1, £300,000 (1.9.1922–1.9.1923) ; No. 2, £250,000 (1.1.1923–1.1.1925) ; No. 3, £250,000 (1.5.1923–1.5.1925) ; No. 4, £250,000 (1.9.1923–1.9.1925) ; No. 5, £240,000 (1.3.1924–1.12.1925) ; No. 6, £240,000 (1.6.1924–1.3.1926) ; No. 7, £240,000 (1.10.1924–1.6.1926) ; No. 8, £240,000 (1.1.1925–1.9.1926) ; No. 9, £240,000 (1.5.1925–1.12.1926) ; No. 10, for replacements, £240,000 (1.8.1925–1.3.1926) ; No. 11, for replacements, £240,000 (1.11.1925–1.6.1926) ; No. 12, for replacements, £240,000 (1.3.1926–1.9.1926) ; Total capital expenditure, £4,545,000.

THIRD, FOURTH AND FIFTH YEARS.—*Maintenance and Operation Expenses.*

	Third Year.	Fourth Year.	Fifth Year.
	£	£	£
(*a*) *Maintenance of Bases.*			
Cardington	120,000	120,000	120,000
Egypt Base	65,000	65,000	65,000
India Mooring Mast Station	12,000	12,000	12,000
Mombasa Mooring Mast Station	9,000	12,000	12,000
South Africa Mooring Mast Station	9,000	—	—
South Africa Base ..	16,000	65,000	65,000
Ceylon Mooring Mast Station	3,000	12,000	12,000
Perth Mooring Mast Station	3,000	12,000	12,000
Melbourne Mooring Mast Station	—	3,000	—
Melbourne Base ..	—	—	65,000
Totals	237,000	301,000	363,000

Total for the three years £901,000.

(*b*) *Upkeep and Operation of Airships and Provision of Fuel.*

No estimate has been prepared for these individual years. At the end of the fifth year, however, when fortnightly services were in being to India, South Africa and Australia, the expenditure under this head would be at the rate of :—Crews (10), £120,000 ; Petrol and oil, £437,000 ; Hydrogen, £437,000 ; Maintenance, £100,000 ; Total, £1,094,000 per annum.

In the above figures petrol has been taken at 3*s.* per gallon and hydrogen at 20*s.* per 1,000 cub. ft.

	Contingencies.	Total.
	£	£
Capital expenditure ..	4,545,000	812,000 5,357,000
Running expenditure ..	*901,000	*688,000 *1,589,000

* + Flying costs.

(*c*) *Carrying Capacity of Services.*—Assuming the full load of the new airships on the longest flight between re-fuelling stations to be 50 passengers and 13 tons of mails and freight, the maximum traffic that could be carried on each of the three routes by a fortnightly service would be :—England–India, 1,300 passengers and 338 tons of freight in each direction, or a total of 2,600 passengers and 676 tons of freight per annum on the route, and similar figures for the other two routes.

Appendix D.

Additional Expenditure involved in carrying out Demonstration Flights to South Africa and Australia in Two-Year Period.

Capital Expenditure.—Provision of Mooring Mast Stations.*—South Africa–Mombasa, £55,000 ; South Africa, £55,000.

Australia : Perth, £55,000 ; Melbourne, £55,000 ; Ceylon (for return journey), £55,000.

Running Expenditure.—Personnel and maintenance of five Mooring Mast Stations, at £1,000 per month per Station for three months, £15,000 ; Two Flights Egypt to Australia and return at £9,000, £18,000 ; Total, £308,000.

* *Details of Mooring Mast Station.*—Mast, £15,000 ; gasometer, £20,000 ; gas main, £2,000 ; gas plant, £6,000 ; buildings, £1,000 ; equipment, £2,000 ; roads, £1,000 ; transport, £3,000 ; add for contingencies, £5,000 ; Total, £55,000.

Up to 5,000 Metres with an Artiste

LAST week Jean H. Casale at Buc aerodrome ascended to 5,000 metres with as passenger Mlle. Hegoburu, a well-known French artiste—about the ceiling, we fancy, for one of the gentler sex.

Super-marines in Fiji

IN a communication dated from Suva on July 16, *The Times* correspondent describes how for the first time in their existence Fijians have had the experience of seeing a real flying machine over their heads and above the tops of their mainland promontories.

For some ten days a Super-marine four-seater Channel type flying boat has been making tests, which included many flights round the two main islands of the Fiji Group. A survey of the whole coast-line from the air has been made round the principal island of the group, Viti Levu.

Undoubtedly, the correspondent adds, Fiji presents flying possibilities for the future, and if the Government decide to follow up this successful test by the establishment of a Flying Boat Air Mail Service it will do much towards reducing the terrible delay that at present exists in exchange of correspondence among the group.

Scandinavia and Air Agreement

AN Air Convention between Norway and Denmark was signed in Copenhagen last month. It includes regulations as to the establishment of air lines between the two countries, Customs regulations, carriage of goods, W/T sets and cameras. The frontiers of the two countries may be crossed at any points except over certain prohibited areas. In Norway seaplanes may land at any Customs port, but assistance can only be given to aircraft at the Military flying stations at Horten, Kristiansand and Bergen. Aeroplanes must land at Kjeller, but when Military training is being carried out at Kjeller they must land at Vaernes. Iceland will probably shortly adhere to this Convention, and it is expected that a Convention between Norway and Sweden will shortly be signed and later another between Norway and Finland.

A French Airship Service

FROM Paris it is reported that a French syndicate is now preparing the organisation of an oversea airship service between Marseilles and Algiers. It is, we understand, intended to employ on this line three of the surrendered German airships, the "Nordstern," the "L.72" and the "L.Z.113." At present there is no direct air line running between Paris and Marseilles, the nearest approach to this being the service between Bordeaux, Toulouse and Montpellier. It is not to be doubted, however, that as soon as the airship service is in operation the Paris-Marseilles aeroplane route will be opened. As the intention is to run a night service over the sea, probably the aeroplane service from Paris will be so arranged that the machines leave in time to connect with the airship leaving Marseilles in the evening. It should then be possible for a business man to leave London about midday, and, by connecting with the other services at Paris and Marseilles, be in Algiers the next morning.

LONDON TERMINAL AERODROME

Monday Evening, August 22.

PASSENGER traffic to and from the continent appears to have settled down—at any rate for the present—to a weekly total of about 450. This week the number of bookings to Paris has been rather low, but, on the other hand, the passengers from the continent have been more than usually numerous; and this has balanced the total. Last week a similar state of things prevailed, the bookings from this side falling off appreciably.

The K.L.M. are still carrying between 20 and 30 passengers a week between London and Amsterdam, in addition to large loads of goods. On Friday one of the monoplanes, piloted by Mr. Duke, got off with a load of over 900 lbs. Capt. Leverton is finding that, as the pilots gain confidence in this machine, the load they can carry is steadily improving. The K.L.M. are making increasing use of their D.H.9's, several of these machines having been used on the London-Amsterdam route this week.

I am informed that the K.L.M. now have a flourishing aerial photographic department in Holland, and are getting a number of orders for "aerials" of factories and country-houses.

Mr. Plesman, the manager of the K.L.M., was in London during the week. He was, I gather, investigating the strength of the threatened competition on the London-Holland route.

Handley Page Staff Outing

THE staff of Handley Page Transport had their annual outing to Brighton on Sunday. The party left the aerodrome —forsaking the air for the road—by char-à-banc at 8.30 a.m., and "landed" at Brighton at 11.30 a.m.

Luncheon was served at the Queen's Head Hotel, and the directors of the firm attended at the invitation of the staff. The after-luncheon speeches were full of the good feeling which exists between the workers and the directors, while the interest that every member of the staff displayed in all matters pertaining to civil aviation augurs well for the future of this pioneer firm.

All the usual seaside enjoyments were sampled during the afternoon, the majority of the party disporting themselves either in or on the sea. At 7 p.m. the return journey was commenced, and a "night landing" was made at Croydon shortly after 10 o'clock—the char-à-banc coming to rest outside Trust Houses just too late!

Mr. Flowers was highly delighted with the success of the outing, and especially with the good feeling between directors and staff, which he feels sure will render all employés more keen upon the welfare of the firm.

Proposed "Amphibian" Service

WITH regard to schemes for new services now before the Air Ministry, I hear that one of the suggestions is for a service of "amphibians" from the Thames to the Seine.

The drawback of present "amphibians" is their poor commercial load-carrying capacity—as contrasted with land-'planes—but Messrs. Vickers are, I am told, now confident, following exhaustive tests on the "Viking," that they can provide an "amphibian" which will carry six passengers and a pilot with the Napier "Lion" engine, and do so with the speed requisite for continental all-weather flying.

This would probably put the scheme on a commercial footing, as, of course, the cost of motor transport to and from Croydon and London, and Le Bourget and Paris, would be saved; while the possibility of doing the whole journey from city to city in about 2½ hours, instead of the present 4 to 5 hours, should enable a slightly higher fare to be charged. In any case the experiment would be interesting.

It would not be necessary to fly over London in thick weather, for the river could be approached outside the radius of the houses, and then followed up or down to the alighting place. If there was fog over the river, an "amphibian" would have the same chance as an aeroplane of reaching Croydon, where all facilities exist for getting passengers up to Town.

Mr. Larry Carter is to fly a Bristol "tourer" out to Madrid for the Bristol Company. A number of these "tourers," with Spanish registration marks, have passed through Croydon from time to time, and the firm seem to be doing good business in Spain. While waiting for his machine, Mr. Carter has been piloting for both the Surrey Flying Services and Capt. Herne.

The Grands Express continue to carry more than 100 passengers a week, this week's total being 113. When the number of passengers falls below full load, the Grands Express have a regular consignment of drums of oil with which they make up the load of the machine, so that the Goliaths always leave well-laden.

On Saturday two Goliaths arrived from Paris with 23 American lady students in charge of an American Express guide.

An "Air Taxi" Adventure.

MR. COBHAM, in one of the De Havilland Aircraft Company's D.H. 9's, landed on the aerodrome today. He had been over to Le Touquet with some special passengers, and had alighted on a narrow strip of beach. Owing to the slope of the sands the machine had turned towards the sea and run down the beach till the wheels of the chassis were submerged. Seeing that the tide was going out, the passengers sat in the machine until they could climb out on to the sands dryshod.

The "9" was a great attraction to the children of the neighbourhood, and Mr. Cobham, apparently dozing in his seat as he waited for the tide to run out, felt a movement of the joy-stick as the elevators on the tail-plane were moved up and down. Turning round to say a few words of remonstrance, in his best French, to the children, he discovered that the movement was due not to their interference, but to the action of the waves.

After the tide had receded, however, the children began to climb all over the machine, so Mr. Cobham chalked a warning, in quaint "old-English French," on the side fo the *fuselage*, and it was still there when he landed back at Croydon today. On the return journey he was fog-bound at St. Inglevert, and had to remain there overnight.

Illuminating the "Airway"

MR. LEYSMITH, who is in charge of searchlights on the aerodrome, is to go to Lympne to supervise the installation of searchlights there.

During the last week there have been two applications from people who wished to hire an "air special" to fly during the night, and, although neither of these could be accommodated, the work of lighting the aerodromes is being pushed forward. One of the would-be night-flyers had missed the cross-Channel boat, and wished to catch a liner at Le Havre; while the other, a surgeon, was in a hurry to get to the bedside of a patient in Pau.

Messageries Aériennes have, on the whole, had quite a good week. They have suffered rather from a shortage of passengers from this side, but from Paris the loads have been satisfactory. What pleased M. Didier was the lack of engine-trouble, and the general smooth running of the machines during the week.

There has been no joy-riding this week-end, the reason being that all the joy-ride machines are out of action. Mr. Macintosh crashed Capt. Herne's Avro last week-end near Maidstone. In attempting to land in a field he glided low over a hedge, and failed to notice a wire running about a foot above the top of the hedge.

Captain Muir crashed one of the Surrey Flying Service Avros in Wales by catching the skid of the machine in a protruding portion of a hedge. Later in the week the remaining joy-ride Avro was also crashed. Repairs to all three are being pushed forward, as there is a lot of important "air-taxi" work to be done.

Colonel Beatty was at the aerodrome on Sunday, and personally flew the Napier-Westland.

The Vickers-Vimy, "City of London," the undercarriage of which collapsed at Le Bourget, has been patched up and flown to Brooklands, where she is now being thoroughly overhauled. Mr. Cyril Holmes is back from leave, and ready to take up his new duties with the Instone Air Line.

The Derelict Airship Mast

ALL the portable gear, including the steam-winding engine, has been removed from the foot of the airship mooring-mast, and the mast itself is, I understand, shortly to be dismantled and stored.

There are two big "air-taxi" flights, having a strange resemblance to one another, scheduled for this month. Mr. Cobham is to go on a tour of Europe with a special passenger, accompanied by Mr. Fox, of "Air Express," Paris. The details of the trip appear to be a profound mystery.

The other flight is to be undertaken at the end of the month by Captain Muir, and his passenger will be M. Gogo, the Belgian business man who has been making a constant use of the Surrey Flying Service's "air-taxis." He is to fly to Constantinople by way of Berlin, Prague, Vienna, and Warsaw, and return *via* Rome and Paris.

Two cricket matches have been played during the week, and both were two-innings matches. On Saturday the aerodrome team beat the Croydon Telephones by 10 wickets; while on Sunday Mr. Powell's eleven were beaten by the Air Ministry staff on the aerodrome by an innings and eight runs. In this match Captain Glasson put up the aerodrome's record score of 54 not out.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, August 16

Permanent Commissions

Flying Offr. F. A. Norton is granted a permanent commn. in rank stated, retaining his present seny.; Dec. 12, 1919. (Since promoted.) (*Gazette*, Dec. 12, 1919, appointing him to a short service commn., is cancelled.)

Stores Branch

Flight Lieut. H. J. Down is granted a permanent commn. in rank stated for Accountant duties; June 8.

Short Service Commissions

The following are granted short service commns., in the ranks stated, with effect from, and with seny. of, the dates indicated, except where otherwise stated:—

Flight Lieut. (*from Sqdn. Ldr.*).—R. T. Leather, A.F.C.; Aug. 8.

Flying Offrs. (*from Flight Lieuts.*).—H. M. T. Lehmann, M.C.; Aug. 8. S. J. Sibley; Aug. 2.

Flying Offr. (*from Pilot Offr.*).—D. I. M. Kennard; Aug. 3.

Pilot Offr. on Probation.—J. B. H. Rogers; Aug. 8.

Officers appointed to commns. in a rank lower than their previous substantive rank will be placed at the head of the list of officers of the rank to which they are gazetted, but junior to all officers similarly reduced in rank on grant of permanent or short service commns.

Flying Offr. G. W. Robinson relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Lieut.; Aug. 18.

Stores Branch

J. L. Armstrong (late Lieut., R.A.P.C.) is granted a short service commn. as a Flying Offr. on probation for Accountant duties; July 7. The seniority of all officers granted commissions in the Stores Branch for Accountant duties is provisional only. The final seniority list of all such officers will be promulgated when the establishment is completed.

Flying Branch

Sec. Lieut. E. A. Shearing to be Lieut; Aug. 21, 1919 (since demobilised).

The follg. relinquish their temp. commns. on return to Army duty:—Flight Lieut. J. M. Burd, M.C. (Lieut., R.F.A.), Flying Offr. D. M. Cassidy, M.C. (Lieut., R.G.A.); Aug. 1. Observer Offr. W. (Watson) Smith, D.F.C. (Lieut., Gordon Hrs.); Aug. 4.

Sec. Lieut. P. H. D. Blackman (Unemployed List) relinquishes his temp. commn. on joining the T.F.; May 5, 1920. Lieut. A. C. Weeks (Unemployed List) relinquishes his temp. commn. on joining the R.E.; July 26. Lieut. L. J. Balderson is transfd. to the Unemployed List; Aug. 19, 1919.

Administrative Branch

The follg. offrs. relinquish their temp. commns. on return to Army duty:—Capt. L. McNeill-Hewitt (Capt., R.A.S.C.); Jan. 9, 1919. Flying Offr. P. W Smith (Lieut. Royal Fus; Aug. 1.

Memorandum

Flight Lieut. A. W. Hammans (Capt., Duke of Cornwall's L.I.) (from S.O. relinquishes his temp. commn. on ceasing to be employed; Aug. 3.

IN PARLIAMENT

Howden, Pulham and Croydon Aerodromes

VISCOUNT CURZON on August 16 asked the Secretary of State for Air whether it is the intention of the Government to dispense with the aerodromes, sheds, and all gear now at Howden, Pulham, and Croydon in connection with the handling of airships should the ships themselves be disposed of; and whether any use is made of the aerodromes pending the Empire decision?

Capt. Guest: The reply to the first part of the question is that Howden will be given up, as it is not considered that it would be necessary to a future airship undertaking; that Pulham will be placed in charge of a care and maintenance party pending the result of the deliberations of the Dominion Governments, when, if the result is unfavourable, it will be disposed of; and that Croydon will be retained permanently as an aerodrome, the airship appliances being temporarily stored. The reply to the second part is in the negative so far as the Air Ministry is concerned, except for the tests which remain to be carried out in connection with "R38."

Mr. Gilbert asked whether the air station at Waddon, Croydon, is the property of the Air Ministry; whether privately-owned aeroplanes are allowed to use the same free; if not, what charge is made for the use; and whether this station is used at present by the Royal Air Force for any of their machines?

Capt. Guest: The air station at Waddon is the property of the Government. Privately-owned aeroplanes are not allowed to use this aerodrome free; the charges vary from 2s. 6d. to 10s. for each landing, according to the type of machine. The aerodrome is not normally used by Royal Air Force machines.

Royal Air Force Appointment

MR. E. HARMSWORTH asked why the appointment of Air Vice-Marshal J. F. A. Higgins, C.B., D.S.O., A.F.C., was suddenly found necessary on January 17, 1921, when during the course of the War and the two subsequent years after the Armistice there was no such position; and what are the qualifications of Air Vice-Marshal Higgins for the appointment?

Capt. Guest: In common with many other measures of importance in connection with the permanent organisation of the Royal Air Force, the commencement of the work on which this officer is engaged was deferred until the more urgent problems of demobilisation and evacuation of war-time stations had been settled. Air Vice-Marshal Higgins was formerly an officer of the Royal Artillery, and has had a distinguished career in the R.F.C. and R.A.F. from 1912. His service experience renders him eminently suitable for his present responsible duties.

Civil Aviation in Great Britain

MR. RAPER asked the Secretary of State for Air if he will make a statement as to the present position of British civil aviation, indicating the passenger and/or postal services existing; the average daily number of miles covered by these services; the fares and rates being charged; particulars of the facilities being given by the railway companies to assist the aviation companies in the distribution of the passengers, mails, etc.; and the types of machines being employed on these services?

Capt. Guest: The following particulars relate to the *regular* cross-Channel services only, and do not include *irregular* services or passenger flights in England:—

(1) Two British regular passenger and postal services exist at the present time operating between London and Paris.

(2) The average actual daily mileage covered by these services was: 3 months ending June 30, 1921, 520; month ending July 31, 1921, 1,125.

(3) The fares and rates charged are:—

Passenger.—£6 6s. single (includes motor transport between aerodrome and centre of town). £12 return (which includes 30 lbs. luggage free).

Freight.—100 lbs. or under, 1s. per lb. Over 100 lbs., 10*d.* per lb.

Postal Rates.—Letters surcharged 2*d.* per oz. Parcels surcharged 1s. per lb.

(4) The standing instructions for the disposal of the mail, in the event of a forced landing, laid down by the General Post Office, include an arrangement such that, if in the event of a forced landing the mails would reach London most quickly if sent by train, the stationmaster at the nearest station will accept the mails for transmission by the next train to London. The percentage of efficiency of the British mail services was 100 per cent. for the June quarter, and the above arrangement has, therefore, not been utilised.

(5) The types of machines used on these *regular* services have been: De H. 18, Handley Page, and Vickers Vimy, supplemented occasionally by a B.A.T.

For further information on the subject I would refer my hon. friend to the "Half-Yearly Reports on Civil Aviation," which are presented to Parliament as Command Papers.

Civil Aviation in France

MR. RAPER asked the Secretary of State for Air if he will make a statement as to the present position of French civil aviation, indicating the passenger and/or postal services they are running, the average daily number of miles covered by these services, the form of subsidy the French aviation companies are receiving from the French Government, the fares and rates being charged, particulars of the facilities being given by the French railway companies to assist the aviation companies in the distribution of the passengers, mails, etc., and the types of machines being employed on these services?

Capt. Guest in his reply gave details of present fares and rates, days of service, passenger, postal and freight facilities, machines used, etc., of the three French companies running services in France, and of the five companies running International Services.

It was also stated that in every case special reductions are offered to members of aero clubs and officials of aviation societies. If these services were carried out as advertised, the average daily mileage flown is 5,110.

Details of the French subsidies (33,215,000 francs, at par exchange £1,328,600), for Civil Aviation were also given. (These appeared in full in FLIGHT on March 17, 1921 (page 190).

War Inventions

MR. ARTHUR MICHAEL SAMUEL on August 17 asked the Secretary of State for Air whether he is aware that the principal drawings and documents regarding a War invention by Mr. Heane, of Ash Vale, Surrey, for synchronising gear by which a bullet was timed to pass through the propeller of an aeroplane without damaging the blades, were lost or destroyed by officials at the Air Ministry; that the Sopwith Company received an award of £3,500 for a similar invention, although they did not introduce it till 12 months after Mr. Heane had submitted his idea; and why Mr. Heane's claim was heard in secret and was not brought before the Royal Commission on War Inventions?

Capt. Guest: I am aware that Mr. Heane has made allegations against the Air Ministry regarding the loss of drawings and documents, but the Department's records do not bear out his assertion that these drawings and documents were ever received. An award has been made to the Sopwith Aviation Company, Ltd., in connection with their invention. Mr. Heane's claim for an award in respect of his alleged invention was rejected by the Department on the ground that his submissions of the idea of a synchronising gear was subsequent to the development and use of synchronising gears by the Air Services, and that his proposals had not contributed in any way to their further development. He appealed to the Royal Commission on Awards to Inventors and the claim on examination by the Investigating Committee of the Commission was found not suitable for hearing by the Commission as a whole, and was rejected.

Mr. Samuel: Is not the hon. and gallant gentleman aware that the Department has already admitted that the documents in question were either lost or unintentionally destroyed, and does he think it is in accord with public policy that this man should rest under a sense of grievance, and will he see the man if he comes to see him personally

Capt. Guest: Yes, certainly.

Air Pilots' Licences

CAPT. ELLIOT asked the Secretary of State for Air whether, in view of the coroner's verdict at the inquest held upon the late H. G. Hawker, which attributed the cause of the accident to the physical disability of the deceased and of the long history of tubercular caries of the spine disclosed by the post-mortem examination, he can state if these physical defects were ascertained at the medical examination at the Air Ministry which took place on the 31 December, 1920; and, if not, will he state what further precautions are being taken to prevent the issue of class B pilots' licences to persons suffering from physical defects likely to be prejudicial to the safety of air navigation?

Capt. Guest: The fact that Mr. Hawker had had tuberculosis was known at the Air Ministry, but at the examination in December, 1920, in the opinion of the medical officer his state of health warranted the renewal of the licence. This licence expired at the end of June, 1921, and at the time of his death Mr. Hawker was flying without a licence. In all cases, both for the original grant of a "B" licence and for its renewal, a most careful medical examination is carried out, and it is unlikely that a person suffering from physical defects likely to interfere with his qualifications as a pilot would successfully pass this examination.

Capt. Elliot: Do I understand it would have been impossible for Mr. Hawker to take up a passenger?

Capt. Guest: Yes, that is so.

Royal Air Force (Ismailia Station)

MAJOR M. WOOD asked the Secretary of State for Air whether No. 4 Training School, Royal Air Force, was sent out to a disused camp in the desert, 12 miles from Ismailia, in June last, at the beginning of the hottest weather, without mattresses, mosquito nets, and other common necessaries; that there is no provision for wives of officers or men, and that the few wives who accompanied their husbands have only tents to live in, and no furniture or equipment of any kind; and what necessity there is for subjecting this unit to war conditions at the present time?

Capt. Guest: No. 4 Training School is a new unit which, on formation, has occupied the site referred to. This station was provided during the War with buildings for two squadrons, but I am aware that the present accommodation for married quarters is insufficient, and measures are being taken to improve it. As regards the provision of mattresses and other equipment, I have called for a report from Egypt, and will communicate with my hon. and gallant friend as soon as it is received.

The Coupe Deutsch.

FRANCE has now entered five machines for the Deutsch race at Etampes, on October 1. These are: Hanriot (Pilot Rost), Lumiere de Monge (de Romanet), Nieuport (Gordon-Bennett type), Sesquiplan (Nieuport-Delage) (2). The two Nieuport-Delage machines are of new type and are expected to be very fast. The three Nieuport pilots will be Sadi Lecointe, Kirch and Lannes. As each country is only allowed to enter three machines, elimination trials will have to be held by France. We hope that James will represent this country on the Mars I, winner of the Derby.

R.A.F. Co-optimists

THAT most of the "boys" who strafed the Germans from the air were optimists—and enthusiastic optimists at that—was during the War an axiom. That a trio—Mr. Laddie Cliff, Mr. Archibald de Bear and Mr. Clifford Whitley—of R.A.F. men should therefore have consolidated themselves as "Co-optimists" after the War is not surprising. That the combination has co-opted to such effect as to be, with their wonderful company of entertainers, drawing all London, or as many as could get in, first to the Royalty Theatre and now to the Palace Theatre, is a reminder of the brains and talent whose owners selected the air for *their* mission against the arch-enemy. Therefore hearty congratulations to the venturers upon their well-merited reward. Probably the success of the "Co-optimists" is the outstanding note of the 1921 entertainment season.

A "Bigamist" Time-table

QUITE a novel little story of smart enterprise by our Air Service pioneers is to hand. On Saturday morning last a couple of travellers just arrived in Paris from the South of France *en route* to America—were walking through the Champs Elysees, when their attention was attracted to a notice about "The Bigamist" film at the Alhambra Theatre, London, and it was decided that as they were going to London by air the same day, it would be very entertaining, after dining, to wind up with a visit to the Alhambra. Saturday evening in London being an exceedingly popular night for the theatres, the question immediately arose as to how it would be possible to reserve seats for the performance. They returned to the offices of the Instone Air Line and inquired if seats could be booked through the Instone Agency, and were advised that such could be done, and a voucher was handed them to obtain two seats at the Alhambra.

The Alhambra Management was duly notified, and, realising that this particular transaction constituted a new record, made arrangements for the proper theatre tickets to be forwarded to the Croydon Aerodrome and handed to the two travellers upon their arrival in exchange for the Instone voucher. This was carried out, and the two gentlemen, after a quiet dinner, were able to witness the performance of "The Bigamist" in comfort the same evening.

Time-table.—Party arrived Paris from Nice Saturday morning 12 o'clock.

Theatre ticket voucher issued 3.35 p.m. at the Instone offices. One of the Instone Mail aeroplanes, "City of Cardiff," with eight passengers left Paris at 4 p.m. Reached Croydon 6.10 and theatre tickets were handed over. Arrived at the Alhambra Theatre 8.25. Left London Sunday morning for New York.

Two Pilot-Officers Killed

WHILE on a practice cross-country flight on August 19 two officers were killed in an aeroplane accident near Thetford. At the inquest it was stated in evidence that the officers, Pilot-Officer E. R. Lush and Pilot-Officer E. A. Rush, who were under instruction at Duxford, were making a practice flight to Bereham Newton and back, and must have lost their way. They were in the air for over three hours, whereas the journey should only have taken half an hour. The petrol tank was found to be empty, and in attempting to turn into the wind the machine nose-dived. A verdict of "Accidental death" was returned.

Aeroplane Accident at Martlesham

WHEN starting out for a flight at Martlesham aerodrome, near Ipswich, on August 16, an aeroplane with four people on board crashed into a shed and was wrecked, the pilot Captain O. M. Sutton, M.C., and Aircraftsman Cheridan being killed. The other two occupants escaped, one of them by jumping clear. The inquest threw little light on the cause of the accident. Corporal Ellison, who was one of the occupants, stated that he was in charge of the engines, which were working smoothly.

NEW COMPANY REGISTERED

AERIAL ROUTES SYNDICATE, LTD.—Capital £100, in £1 shares. Objects: to establish an aerial transport service between England and Holland and elsewhere, to manufacture, deal, etc., in aeroplanes, etc. First directors: H. H. Bond, Maj. W. E. de B. Whittaker and J. F. McGregor. Solicitor: A. Harris, Balfour House, Finsbury Pavement, E.C. 2.

PUBLICATIONS RECEIVED

Aircraft Year Book, 1921. Small, Maynard and Co., Boston, Mass., U.S.A.

The A.B.C. Motor Marine and Aircraft Guide, 1921 (*Where's Where?*). Compiled by W. C. Bersey and A. Dorey. London: The Red Book Publishing Co., Ltd., 1, Gough Square, E.C. Price 7*s.* 6*d.* net. (post free 8*s.* 6*d.*, abroad 9*s.*).

Technical Note No. 52. *A New Method of Testing Models in Wind Tunnels.* By W. Margoulis. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 57. *The Caproni Seaplane.* By Max Munk. The National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 59. *The Dynamometer Hub for Testing Propellers and Engines During Flight.* By O. Enoch. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Report No. 111. *The Variation of Aerofoil Lift and Drag Coefficients with Changes in Size and Speed.* National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Report of the Advisory Committee for Aeronautics for 1917–18. *Vol.* 3. *Strength of Construction, Etc.* London: H.M. Stationery Office. Price 21*s.* net.

Pictorial Show-Card of the 12 *h.p. Swift Car (in colours).* Swift (of Coventry), Ltd., Coventry.

Technical Memorandum No. 28. *Slotted Wings.*—Department of Controller-General of Civil Aviation, Air Ministry, London, W.C. 2.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors. The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1919
Published August 25, 1921

16,823. H. E. S. HOLT. Parachute flares. (166,909.)

APPLIED FOR IN 1920
Published August 25, 1921

11,311. C. K. CHANDLER. Wireless direction-finding apparatus. (166,758.)
12,299. C. BOWER. Gas valves for airships and balloons. (167,009.)
14,116. A. BOERNER. Method for maintaining necessary conditions of life in aircraft *fuselage* when flying at great heights. (167,029.)
19,651. COMMERCIAL AEROPLANE WING SYND. and H. BOOTH. Aeroplanes. (167,068.)
19,733. H. JUNKERS. Two-stroke-cycle I.C. engines. (147,730.)
20,126. B. MAUVILLIER. Carburettors for aeroplane motors. (148,205.)

APPLIED FOR IN 1921
Published August 25, 1921

6,501. H. LEITNER. Metal propellers. (167,120.)

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